

REMARKS

The claims now pending in the application are Claims 1 to 21, the independent claims being Claims 1, 9 and 21. Claims 1 and 9 have been amended herein. Claim 21 is newly presented herein.

In the Official Action dated July 30, 2003, Claims 1 to 8 were rejected under 35 U.S.C. § 102(e), as anticipated by U.S. Patent No. 6,380,660 (Maeno), and Claims 9 to 20 were rejected under 35 U.S.C. § 103(a), as unpatentable over the Maeno '660 patent in view of U.S. Patent No. 5,760,528 (Tomikawa). Reconsideration and withdrawal of the rejections respectfully are requested in view of the above amendments and the following remarks.

In formal matters, the specification and abstract of the disclosure have been amended as to matters of form, including English spelling, grammar, idiom, syntax and the like. No new matter has been added.

The rejections of the claims over the cited art respectfully are traversed. Nevertheless, without conceding the propriety of the rejections, Claims 1 and 9 have been amended herein more clearly to recite various novel features of the present invention, with particular attention to the Examiner's comments. Support for the proposed amendments may be found in the original application. No new matter has been added.

Newly presented independent Claim 21 has been added to provide Applicants with an additional scope of protection commensurate with the disclosure. No new matter has been added.

The present invention relates to a novel vibration wave driving apparatus. In one aspect, as now recited in independent Claim 1, the vibration wave driving apparatus comprises a vibration member having a shape that is line-symmetrical with respect to two orthogonal planes, electro-mechanical energy conversion elements which selectively excite in the vibration member three different types of bending vibrations which each displace in

a direction in parallel with the two planes, and a driving member which is brought into contact with driving portions of the vibration member and driven by vibrations excited in the vibration member.

In another aspect, as now recited in independent Claim 9, the vibration wave driving apparatus comprises a vibration member formed by a plate member and projections protruding from a surface of the plate member and having a shape that is line-symmetrical with respect to two orthogonal planes, electro-mechanical energy conversion elements which are fixed to a surface of the plate member which is opposite the surface from which the projections protrude, and selectively excite three different types of bending vibrations that displace in a direction perpendicular to the plate member, and a driven member which comes into contact with the projections of the vibration member, wherein synthesis of two of the three different bending vibrations selectively drives the driving member in an arbitrary direction in three dimensions.

In another aspect, as recited in newly presented independent Claim 21, the vibration wave driving apparatus comprises a vibration member which has an electro-mechanical energy conversion element, and a driven member which is in contact with the vibration member and is driven by a vibration excited on the vibration member, wherein application of alternating signals to the electro-mechanical energy conversion element generates on a surface of the vibration member three bending vibrations having the same displacement direction but mutually different mode positions.

Applicants submit that the prior art fails to anticipate the present invention. Moreover, Applicants submit that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

The Maeno '660 patent relates to a vibration type actuator and vibration type driving apparatus, and discloses a vibration type driving apparatus including a vibration member that generates therein three different vibrations. However, Applicants submit that the Maeno '660 patent fails to disclose or suggest at least the above-described features of the present invention. Rather, as illustrated in Figures 3B to 3D therein, the Maeno '660 patent vibration member generates therein respective vibration displacements in at least three *different* directions. Nowhere does the Maeno '660 patent disclose or suggest the feature of a vibration member that generates three vibrations that displace in the same direction, e.g., the 'z' direction as illustrated in Figures 1 and 2 of the present application. Nor does the Maeno '660 patent disclose or suggest the feature of a vibration member having a shape that is line-symmetrical with respect to two orthogonal planes, and electro-mechanical energy conversion elements which selectively excite in the vibration member three different types of bending vibrations which displace in a direction in parallel with the two planes, as disclosed and claimed in the present application (Claim 1).

The Maeno '660 patent further discloses a vibration device in which the vibration member contacts two different driven members at two respective points sandwiching the electro-mechanical energy conversion elements. In such arrangement, vibrations displacing in the 'x' direction and 'y' direction are generated on a surface of the vibration member with which one of the driven members is in contact, and vibrations displacing in the 'y' direction and 'z' direction are generated on a surface of the vibration member with which the other of the driven members is in contact. The Maeno '660 patent system thus disclosed is a system in which it is impossible to drive the driven member(s) in an arbitrary direction by generating three different vibrations on one side surface of the vibration member. Accordingly, the Maeno '660 patent fails to disclose or suggest the feature of an electro-mechanical energy conversion elements which are fixed to a surface of a plate member which is opposite a surface from which the projections protrude, and

selectively excite three different types of bending vibrations that displace in a direction perpendicular to the plate member, wherein synthesis of two of the three different types of bending vibrations selectively drives the driven member in an arbitrary direction in three dimensions (Claim 9).

The Tomikawa '528 patent relates to a vibration actuator, and discloses an ultrasonic actuator including a frame-like elastic member having an outer form in a regular square, and electro-mechanical energy converting elements joined to the frame side portions of the elastic member for generating vibrations in a longitudinal vibration mode and a bending vibration mode so as to generate elliptical motion at predetermined positions in the frame side portions by synthetic motion of the above-mentioned vibrations. However, Applicants submit that the Tomikawa '528 patent fails to disclose or suggest at least the above-described features of the present invention. Although the Tomikawa '528 patent discloses an arrangement for synthesizing two different vibrations at a contact portion at which the vibration member contacts a driven member, nowhere is the Tomikawa '528 patent understood to disclose or suggest an arrangement for driving a driven member in an arbitrary direction by selectively generating three different vibrations on one side surface of the vibration member, and synthesizing two of the three different vibrations to selectively drive a driven member in an arbitrary direction in three dimensions, as disclosed and claimed in the present application. Nor is the Tomikawa '528 patent understood to add anything to the Maeno '660 patent that would make obvious the claimed invention.

Nor is either the Maeno '660 patent or the Tomikawa '528 patent believed to disclose or suggest the feature of a vibration member which generates three bending vibrations of which the displacement direction is the same but the node positions are mutually different, as disclosed and claimed in the present invention (Claim 21).

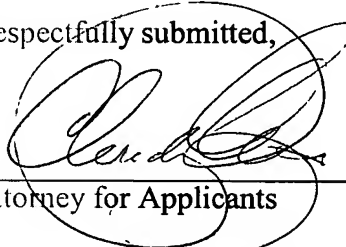
For the above reasons, Applicants submit that independent Claims 1, 9 and 21 are allowable over the cited art.

Claims 2 to 8 and 10 to 20 depend from Claims 1 and 9, respectively, and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Applicants believe that the present Amendment is responsive to each of the points raised by the Examiner in the Official Action, and submit that the application is in allowable form. Favorable consideration of the claims and passage to issue of the present application at the Examiner's earliest convenience earnestly are solicited.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



Attorney for Applicants

Registration No. 32,078

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

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